

Title (en)

HIGH AFFINITY PD-1 AGENTS AND METHODS OF USE

Title (de)

HOCHAFFINE PD-1-WIRKSTOFFE UND VERFAHREN ZUR VERWENDUNG

Title (fr)

AGENTS PD-1 À HAUTE AFFINITÉ ET PROCÉDÉS D'UTILISATION

Publication

EP 3699189 A1 20200826 (EN)

Application

EP 20166891 A 20150807

Priority

- US 201462035316 P 20140808
- US 201562150789 P 20150421
- EP 15829652 A 20150807
- US 2015044356 W 20150807

Abstract (en)

High affinity PD-1 mimic polypeptides are provided, which (i) comprise at least one amino acid change relative to a wild-type PD-1 protein; and (ii) have an increased affinity for PD-L1 relative to the wild-type protein. Compositions and methods are provided for modulating the activity of immune cells in a mammal by administering a therapeutic dose of a pharmaceutical composition comprising a high affinity PD-1 mimic polypeptide, which blocks the physiological binding interaction between PD-1 and its ligand PD-L1 and/or PD-L2.

IPC 8 full level

C07K 14/705 (2006.01); **A61K 38/00** (2006.01); **A61K 51/08** (2006.01); **A61P 35/00** (2006.01); **C07K 14/47** (2006.01)

CPC (source: EP US)

A61K 35/17 (2013.01 - EP US); **A61K 38/1761** (2013.01 - US); **A61K 38/177** (2013.01 - US); **A61K 45/06** (2013.01 - US); **A61K 47/6849** (2017.08 - US); **A61K 48/00** (2013.01 - US); **A61K 51/08** (2013.01 - EP US); **A61K 51/088** (2013.01 - US); **A61K 51/10** (2013.01 - US); **A61P 35/00** (2018.01 - EP); **C07K 14/4747** (2013.01 - EP US); **C07K 14/70503** (2013.01 - EP US); **C07K 14/7051** (2013.01 - US); **C07K 14/70532** (2013.01 - EP US); **A61K 38/00** (2013.01 - EP US); **C07K 2319/30** (2013.01 - EP US)

Citation (applicant)

- US 201462035316 P 20140808
- US 201562150789 P 20150421
- US 7169874 B2 20070130 - SALAMONE JOSEPH C [US], et al
- WO 0118048 A2 20010315 - INTROGENE BV [NL], et al
- WO 9412649 A2 19940609 - GENZYME CORP [US]
- WO 9303769 A1 19930304 - US HEALTH [US]
- WO 9319191 A1 19930930 - CENTRE NAT RECH SCIENT [FR], et al
- WO 9428938 A1 19941222 - UNIV MICHIGAN [US]
- WO 9511984 A2 19950504 - CANJI INC [US]
- WO 9500655 A1 19950105 - UNIV MCMASTER [CA]
- WO 9309239 A1 19930513 - RES CORP TECHNOLOGIES INC [US]
- KWON ET AL., PROC. NATL. ACAD. SCI. U.S.A., vol. 96, 1999, pages 15074 - 9
- CLOTHIA ET AL., J. MOL. BIOL., vol. 186, 1985, pages 651
- NOVOTNYHABER, PROC. NATL. ACAD. SCI. U.S.A., vol. 82, 1985, pages 4592
- KANEDA ET AL., NEURON, vol. 6, 1991, pages 583 - 594
- PARMACEK ET AL., MOL. CELL. BIOL., vol. 113, 1994, pages 1870 - 1885
- PLATT ET AL., PROC. NATL. ACAD. SCI. USA, vol. 86, 1989, pages 7490 - 824
- WILSON, CELL, vol. 37, 1984, pages 767
- GRAHAM ET AL., J. GEN VIROL., vol. 36, 1977, pages 59
- URLAUB ET AL., PROC. NATL. ACAD. SCI. USA, vol. 77, 1980, pages 4216
- MATHER, BIOL. REPROD., vol. 23, 1980, pages 243 - 251
- MATHER ET AL., ANNALS N.Y. ACAD. SCI., vol. 383, pages 44 - 68
- MIYAGISHI ET AL., NATURE BIOTECHNOLOGY, vol. 20, 2002, pages 497 - 500
- XIA ET AL., NUCLEIC ACIDS RES., vol. 31, no. 17, 1 September 2003 (2003-09-01)
- CHEN ET AL., CELL, vol. 51, 1987, pages 7 - 19
- LLEWELLYN ET AL., NAT. MED., vol. 16, no. 10, 2010, pages 1161 - 1166
- OH ET AL., GENE THER, vol. 16, 2009, pages 437
- SASAOKA ET AL., MOL. BRAIN RES., vol. 16, 1992, pages 274
- BOUNDY ET AL., J. NEUROSCI., vol. 18, 1998, pages 9989
- RADOVICK ET AL., PROC. NATL. ACAD. SCI. USA, vol. 88, 1991, pages 3402 - 3406
- OBERDICK ET AL., SCIENCE, vol. 249, 1990, pages 1527 - 226
- BARTGE ET AL., PROC. NATL. ACAD. SCI. USA, vol. 85, 1988, pages 3648 - 3652
- COMB ET AL., EMBO J., vol. 17, 1988, pages 3793 - 3805
- MAYFORD ET AL., PROC. NATL. ACAD. SCI. USA, vol. 93, 1996, pages 13250
- CASANOVA ET AL., GENESIS, vol. 31, 2001, pages 37
- LIU ET AL., GENE THERAPY, vol. 11, 2004, pages 52 - 60
- TOZZO ET AL., ENDOCRINOL., vol. 138, 1997, pages 1604
- ROSS ET AL., PROC. NATL. ACAD. SCI. USA, vol. 87, 1990, pages 9590
- PAVJANI ET AL., NAT. MED., vol. 11, 2005, pages 797
- KNIGHT ET AL., PROC. NATL. ACAD. SCI. USA, vol. 100, 2003, pages 14725
- KURIKI ET AL., BIOL. PHARM. BULL., vol. 25, 2002, pages 1476
- SATO ET AL., J. BIOL. CHEM., vol. 277, 2002, pages 15703
- TABOR ET AL., J. BIOL. CHEM., vol. 274, 1999, pages 20603
- MASON ET AL., ENDOCRINOL., vol. 139, 1998, pages 1013
- CHEN ET AL., BIOCHEM. BIOPHYS. RES. COMM., vol. 262, 1999, pages 187
- KITA ET AL., BIOCHEM. BIOPHYS. RES. COMM., vol. 331, 2005, pages 484

- CHAKRABARTI, ENDOCRINOL., vol. 151, 2010, pages 2408
- SEO ET AL., MOLEC. ENDOCRINOL., vol. 17, 2003, pages 1522
- FRANZ ET AL., CARDIOVASC. RES., vol. 35, 1997, pages 560 - 566
- ROBBINS ET AL., ANN. N.Y. ACAD. SCI., vol. 752, 1995, pages 492 - 505
- LINN ET AL., CIRC. RES., vol. 76, 1995, pages 584 - 591
- HUNTER ET AL., HYPERTENSION, vol. 22, 1993, pages 608 - 617
- SARTORELLI ET AL., PROC. NATL. ACAD. SCI. USA, vol. 89, 1992, pages 4047 - 4051
- AKYUREK ET AL., MOL. MED., vol. 6, 2000, pages 983
- KIM ET AL., MOL. CELL. BIOL., vol. 17, 1997, pages 2266 - 2278
- LI ET AL., J. CELL BIOL., vol. 132, 1996, pages 849 - 859
- MOESSLER ET AL., DEVELOPMENT, vol. 122, 1996, pages 2415 - 2425
- YOUNG ET AL., OPHTHALMOL. VIS. SCI., vol. 44, 2003, pages 4076
- NICOD ET AL., J. GENE MED., vol. 9, 2007, pages 1015
- YOKOYAMA ET AL., EXP EYE RES., vol. 55, 1992, pages 225
- LI ET AL., INVEST OPHTHALMOL VIS SCI, vol. 35, 1994, pages 2543 2549
- BORRAS ET AL., GENE THER, vol. 6, 1999, pages 515 524
- LIDAVIDSON, PNAS, vol. 92, 1995, pages 7700 7704
- SAKAMOTO ET AL., H GENE THER, vol. 5, 1999, pages 1088 1097
- ALI ET AL., HUM GENE THER, vol. 9, 1998, pages 81 86
- FLANNERY ET AL., PNAS, vol. 94, 1997, pages 6916 6921
- BENNETT ET AL., INVEST OPHTHALMOL VIS SCI, vol. 38, 1997, pages 2857 2863
- JOMARY ET AL., GENE THER, vol. 4, 1997, pages 683 690
- ROLLING ET AL., HUM GENE THER, vol. 10, 1999, pages 641 648
- ALI ET AL., HUM MOL GENET, vol. 5, 1996, pages 591 594
- SAMULSKI ET AL., J. VIR., vol. 63, 1989, pages 3822 - 3828
- MENDELSON ET AL., VIROL., vol. 166, 1988, pages 154 - 165
- FLOTTE ET AL., PNAS, vol. 90, 1993, pages 10613 - 10617
- TAKAHASHI ET AL., J VIROL, vol. 73, 1999, pages 7812 7816
- BITTER ET AL., METHODS IN ENZYMOLOGY, vol. 153, 1987, pages 516 - 544
- HANES, ADVANCED DRUG DELIVERY REVIEWS, vol. 28, 1997, pages 97 - 119

Citation (search report)

- [A] US 2011159023 A1 20110630 - LANGERMANN SOLOMON [US]
- [A] DAVID YIN-WEI LIN ET AL: "The PD-1/PD-L1 complex resembles the antigen-binding Fv domains of antibodies and T cell receptors", vol. 105, no. 8, 26 February 2008 (2008-02-26), pages 3011 - 3016, XP002683218, ISSN: 0027-8424, Retrieved from the Internet <URL:http://www.pnas.org/content/105/8/3011> [retrieved on 20080214], DOI: 10.1073/PNAS.0712278105
- [A] TOPALIAN SUZANNE L ET AL: "Safety, activity, and immune correlates of anti-PD-1 antibody in cancer", NEW ENGLAND JOURNAL OF MEDICINE, THE - NEJM, MASSACHUSETTS MEDICAL SOCIETY, US, vol. 366, no. 26, 28 June 2012 (2012-06-28), pages 2443 - 2454, XP002767416, ISSN: 1533-4406
- [A] DAWN E DOLAN ET AL: "Reports Outline Tumors Findings from Moffitt Cancer Center (PD-1 pathway inhibitors: changing the landscape of cancer immunotherapy) (PD-1 pathway inhibitors: changing the landscape of cancer immunotherapy)", CANCER VACCINE WEEK, vol. 21, 1 July 2014 (2014-07-01), US, pages 3, XP055428249, ISSN: 1543-6810
- [T] MAUTE ROY L ET AL: "Engineering high-affinity PD-1 variants for optimized immunotherapy and immuno-PET imaging", PROCEEDINGS NATIONAL ACADEMY OF SCIENCES PNAS, NATIONAL ACADEMY OF SCIENCES, US, vol. 112, no. 47, 1 November 2015 (2015-11-01), pages E6506 - E6514, XP002772779, ISSN: 0027-8424

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)

WO 2016022994 A2 20160211; WO 2016022994 A3 20160506; WO 2016022994 A9 20170511; CA 2994927 A1 20160211; CN 107108707 A 20170829; CY 1123385 T1 20211231; DK 3177640 T3 20200810; EP 3177640 A2 20170614; EP 3177640 A4 20180103; EP 3177640 B1 20200506; EP 3699189 A1 20200826; ES 2819451 T3 20210416; HR P20201153 T1 20210122; HU E050406 T2 20201228; JP 2017525354 A 20170907; JP 6945444 B2 20211006; PL 3177640 T3 20201102; PT 3177640 T 20200831; US 10800830 B2 20201013; US 11814419 B2 20231114; US 2016039903 A1 20160211; US 2016052990 A1 20160225; US 2017233451 A1 20170817; US 2021040176 A1 20210211; US 2024174729 A1 20240530; US 9546206 B2 20170117; US 9562087 B2 20170207

DOCDB simple family (application)

US 2015044356 W 20150807; CA 2994927 A 20150807; CN 201580054333 A 20150807; CY 201100728 T 20200805; DK 15829652 T 20150807; EP 15829652 A 20150807; EP 20166891 A 20150807; ES 15829652 T 20150807; HR P20201153 T 20200723; HU E15829652 A 20150807; JP 2017050807 A 20150807; PL 15829652 T 20150807; PT 15829652 T 20150807; US 201514821589 A 20150807; US 201514931725 A 20151103; US 201515502439 A 20150807; US 202016883396 A 20200526; US 202318482223 A 20231006